

A new species of *Falsimargarita* (Gastropoda: Vetigastropoda: Trochidae) from the South Atlantic Ocean

Elíezer de Carvalho Rios

Museu Oceanográfico
Fundação Universidade de Rio Grande
Cx. Postal 379
96200-970 Rio Grande
BRAZIL

Luiz Ricardo L. Simone¹

Museu de Zoologia da Universidade de
São Paulo
Cx. Postal 42494
04299-970 São Paulo
BRAZIL
lrsimone@usp.br

ABSTRACT

A new trochid species, *Falsimargarita stephaniae*, is described from about 1200 m depth off the Malvinas (Falkland) Islands, South Atlantic Ocean. The new species is distinguished from the most similar congeneric ones by its exceedingly large spiral cords located only along the periphery of its shouldered whorls. A re-hydrated specimen allowed for the description of some details of the anatomy of the new species, including head-foot, buccal mass, and radula.

INTRODUCTION

Representatives of the trochid genus *Falsimargarita* Powell, 1951, can be distinguished by shell characters such as external iridescence, well-defined spiral whorls, strong spiral sculpture, opened umbilicus, and thin shell wall. The genus encompasses five species occurring in the cold or freezing deep waters off Antarctica and the Magellanic region of South America. The taxon was more recently revised by Dell (1990), who outlined the diagnostic characters of the genus and described two species.

The analysis of a specimens collected by a boat deep-fishing for king crab and tuna revealed the presence of the new species. This paper is part of a larger project of revision of western Atlantic molluscan species, which at the moment is focused on the study of deep-sea trochids.

MATERIALS AND METHODS

A single specimen with dry soft parts was available for study. Dry soft parts were carefully removed and re-hydrated in physiological solution and 3–4 drops of KOH 20% for 3 h, then transferred to 70% ETOH. Only the

head-foot was adequately extracted. The dissection was performed with the specimen immersed under the fixative, in a stereomicroscope. All drawings were done under camera lucida. The radula was removed and cleaned in a boiling solution of KOH for 1 h, then cleaned by sonication in water. The examination was done under a Zeiss electron microscope at the Laboratório de Microscopia Eletrônica of Museu de Zoologia da Universidade de São Paulo.

Institutional abbreviations used in this article are: MORG, Museu Oceanográfico da Fundação Universidade de Rio Grande, Rio Grande, Brazil; MZSP, Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.

SYSTEMATICS

Genus *Falsimargarita* Powell, 1951

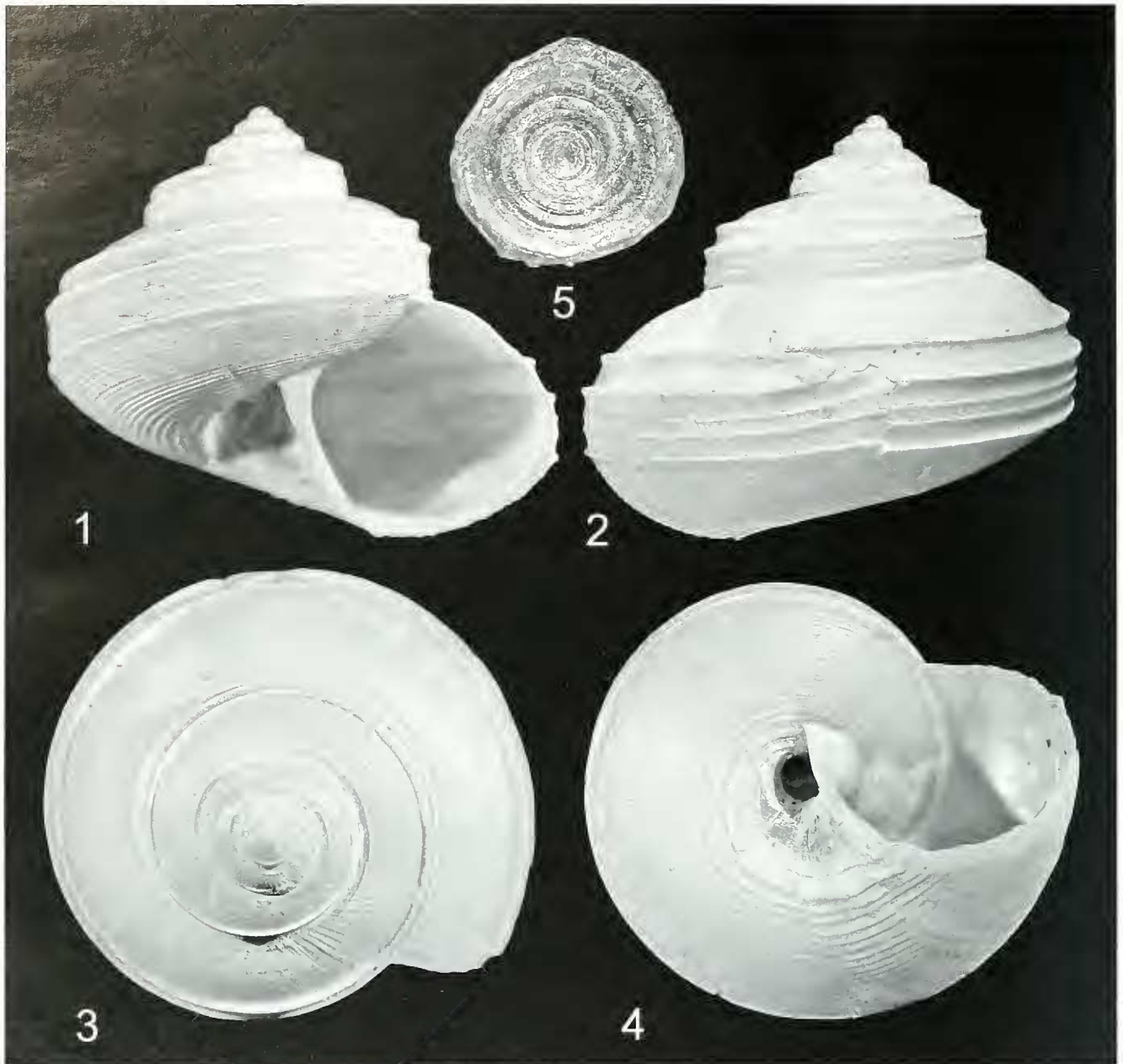
Type species: *Margarites gemma* Smith, 1915; by original designation, Antarctica.

Falsimargarita stephaniae new species
(Figures 1–12)

Diagnosis: Shell with broad spire, 5 prominent large and tall spiral cords restrict to periphery; umbilicus protected by strong plate.

Description: SHELL of medium size (16.6 mm), trochoid to turbiform, whitish, iridescent-gray to pale-reddish; wall relatively thin, light. Protoconch of one smooth, glossy whorl. Separation protoconch-teleoconch poorly defined. Spire with 3.5 teleoconch whorls; each whorl highly convex, relatively high and shouldered; superior half weakly descendent, sculptured by 6–7 low and narrow spiral and numerous axial lines, both equally predominating; inferior half abruptly descendent, sculp-

¹ Author for correspondence

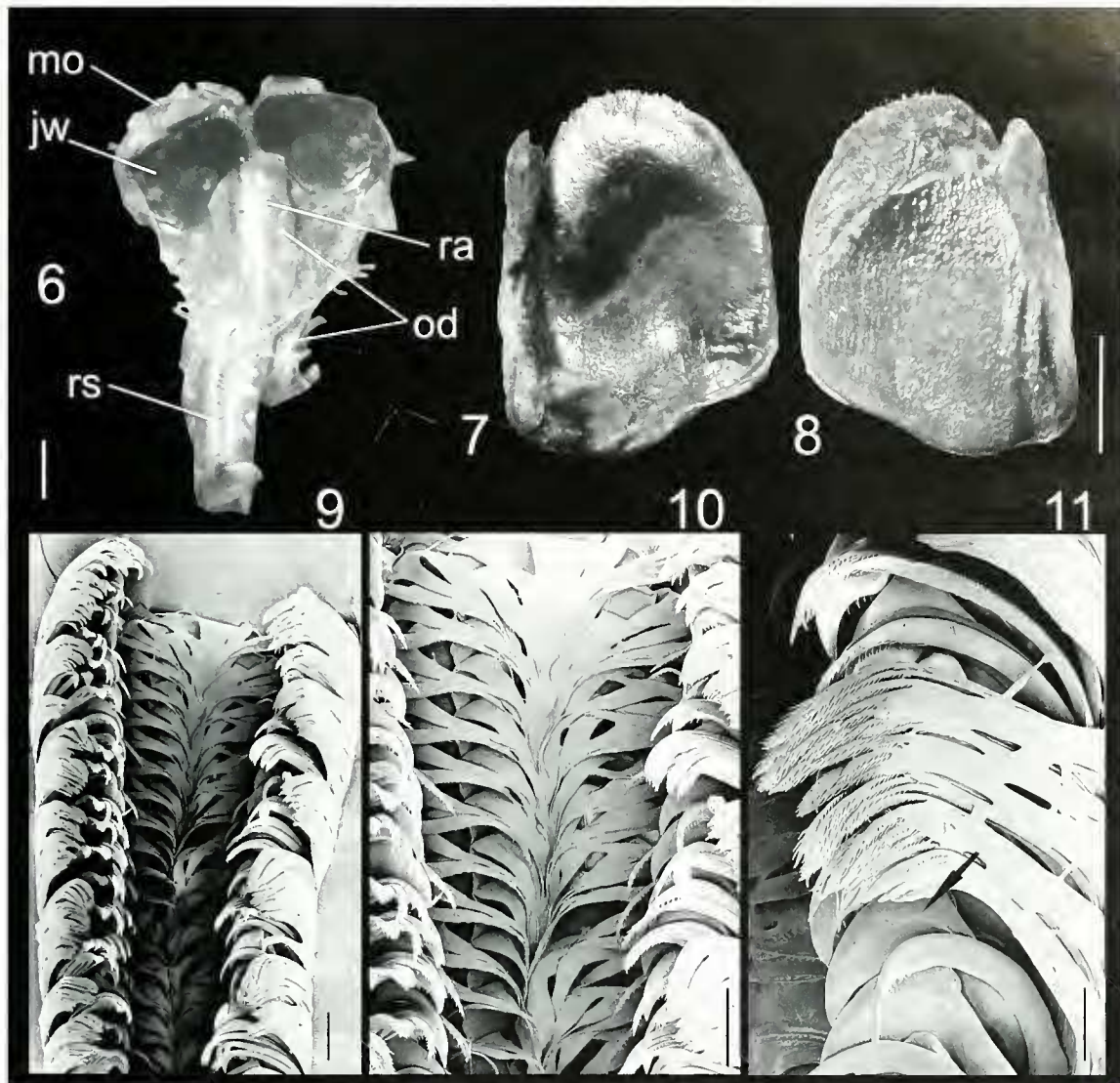


Figures 1-5. *Falsimargarita stephaniae* new species. 1-4. Shell of holotype, apertural, abapertural, apical, and umbilical views (larger diameter 16.6 mm). 5. Operculum, outer view.

tured by five strong and prominent spiral cords, two adapical and one abapical cords clearly larger, latter cord coinciding with suture; smooth area bearing only growth lines present between cords of abapical half of whorl. Body whorl about twice spire width, sculptured with five strong spiral cords that continue unchanged from spire; five spiral cords restricted to periphery area of body whorl; base sculptured with 18 spiral lines successively and gradually broader and more spaced toward umbilicus. Body whorl well separated from umbilicus by larger spiral cord, almost a low carina. Umbilicus open,

deep, surface with simple growth lines; a strong plate-like expansion of the inner lip separates this latter from umbilicus. Aperture rounded, anule. Inner lip slightly deflected on abapical half, somewhat thick; adapical half marked only by thin glazed area on body whorl; no callus present. Outer lip rounded, thin, with small projections corresponding to spiral sculpture.

HEAD-FOOT: Total length about $\frac{1}{2}$ length of last shell whorl. Head protruded, occupying about $\frac{1}{3}$ of total head-foot volume. Snout with about $\frac{1}{4}$ of foot size,



Figures 6–11. *Falsimargarita stephaniae* new species. **6.** Buccal mass, ventral view, ventral wall opened longitudinally along median line and deflected to expose jaws. Scale bar = 1 mm. **7–8.** Left jaw plate, outer and inner views. Scale bar = 0.5 mm. **9–11.** Radula. **9.** General view; **10.** Detail of central and lateral teeth. Scale bars = 100 μm . **11.** Detail of lateral teeth, arrow indicating fifth lateral tooth. Scale bar = 50 μm . Abbreviations: **jw**, jaw; **mo**, mouth; **od**, odontophore; **ra**, radula; **rs**, radular sac.

cylindrical, broad; distal surface flattened, fully covered with small papillae; each papilla cylindrical, tip rounded; mouth central. Tentacles long (about twice snout length), narrow, tip rounded. Ommatophore with about $\frac{1}{4}$ of tentacle length and approximately with same width; located just posterior to tentacles; eyes dark, on ommatophore tips. Foot occupying about $\frac{2}{3}$ of head-foot volume. Mesopodium constituting most of foot, outline somewhat triangular; sole flat, simple; anterior furrow of pedal glands bordered by thick margins, restricted anteriorly, not protruding beyond lateral edges. Epipodium divided into two apparently symmetrical lateral flaps, covering entire dorsal surface of mesopodium, from snout base to opercular pad; bearing

eight pairs of long epipodial tentacles projecting about twice longer than epipodial width, each tentacle protruding on ventral but not on dorsal epipodial surface; each epipodial tentacle bearing papillae at ventral surface of basal region; papillae increasing in number and size toward middle tentacles; some epipodial tentacular papillae bifid at tip. Opercular pad with edges as continuation of epipodium. Columellar muscle thick, encompassing a half whorl.

OPERCULUM: Circular, horny, multispiral; nucleus central; occupying entire shell aperture.

DIGESTIVE SYSTEM: Buccal mass somewhat larger than snout internal space. Buccal cavity having a pair of very large, dark-brown jaw plates, outline somewhat elliptical.

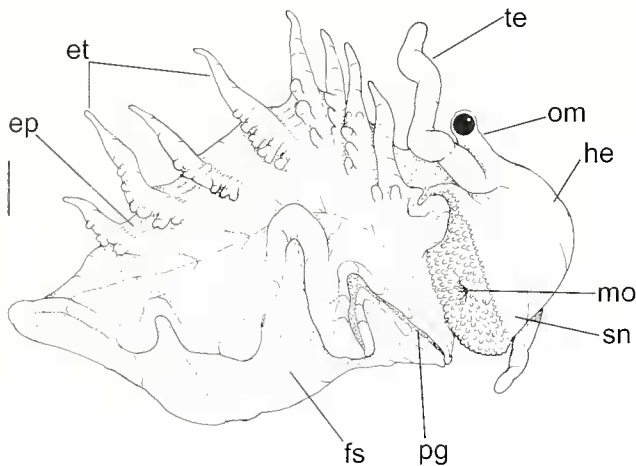


Figure 12. *Falsimargarita stephaniae* new species. Head-foot, ventral to slightly lateral right view, epipodium deflected upward. Scale bar = 1 mm. Abbreviations: **ep**, epipodium; **et**, epipodial tentacle; **fs**, foot (mesopodium) sole; **he**, head; **mo**, mouth; **om**, ommatophore; **pg**, anterior furrow of pedal glands; **sn**, snout; **te**, cephalic tentacle.

both jaws occupying most of dorsal and lateral surfaces of buccal cavity; posterior and lateral regions of jaws low, medial and anterior regions taller, with projected edges; series of small cusps present along anterior and medial edges, each cusp pointed and well separated from each other. Odontophore about half projected into buccal cavity. Radular ribbon about three times odontophore length; about half of radular ribbon projected beyond posterior end of odontophore.

RADULA: Rachidian tooth encompassing about $\frac{1}{4}$ of radular ribbon width, triangular, narrowing somewhat abruptly, strongly curved over its own base; cutting edge sharply pointed, margins with very slender, elongated cusps. First to fourth lateral teeth long, slender, narrowing gradually, curved inward; distal half bearing edges with slender, elongated cusps; tip sharply pointed. Rachidian and four more central lateral teeth thin, flexible. Fiftieth lateral tooth thick, hook-like, curved inward; base broad, thick; distal region arched, resembling a thick scythe. Marginal teeth slender, tall, about 20 pairs per row, slightly broader toward medial region; base ruler-like, weakly curved inward; distal half sharpening gradually, with several slender, elongated cusps along edges about 25 pairs per tooth; tip sharply pointed.

Holotype: MORG 49650 (shell and operculum), MZSP 46559, diameter: 16.6 mm; height: 14.6 mm; includes re-hydrated soft parts and radula.

Type Locality: Argentina, off Islas Malvinas (45°S 58°W), 1200 m depth (fishing boat col., x/2004, Helen Racz leg.).

Distribution: Known only from type locality.

Etymology: The Latinized specific epithet honors the collector's mother, Ms. Teodora Stefania.

DISCUSSION

Although it has been recognized that definitions of generic boundaries in the Trochidae merits further revision, we are reasonably certain of its generic allocation of the new species, because the species possesses the conchological attributes reported in the Introduction for *Falsimargarita*.

There are two other genera also occurring in the South Atlantic Ocean that also exhibit iridescent shells, a character associated with the presence of thin outer shell layers. One of these genera is *Margarella* Thiele, 1893 (see Zelaya, 2004); the new species cannot be allocated into this genus because of its larger size, presence of thin shell wall, and absence of a parietal callus. The other genus is *Gaza* Watson, 1879; *Falsimargarita stephaniae* can not be included in *Gaza* given its taller shell, more rounded spiral whorls, and absence of a flap covering the umbilicus.

Additional comparisons and discussion about *Falsimargarita* is provided by Dell (1990: 93). At first glance, the new species could also be assigned to the Indo-Pacific genus *Otukaia* Ikebe, 1942; however, the new species has lower profile, more elaborate sculpture, and a more widely open umbilicus.

Falsimargarita stephaniae differs from the remaining congeneric species *F. iris* (Smith, 1915), *F. gemma* (Smith, 1915), *F. thielei* (Hedley, 1916), *F. georgiana* Dell, 1990 and *F. benticola* Dell, 1990) by having shouldered whorls, and by the strength of the spiral folds. The other species have a rounded whorl profile and a uniformity of spiral sculpture. Only *F. thielei* possesses differentiable spiral cords resembling those of *F. stephaniae*; however, *F. stephaniae* additionally differs from *F. thielei* by having a larger number of those outstandingly large spiral cords at the shell periphery and a taller spire.

The bathymetry is also a distinctive among *Falsimargarita* species. *Falsimargarita gemma*, *F. iris*, and *F. thielei* occur in depths to 400 m. *Falsimargarita benticola* and *F. georgiana* are found in deeper waters around 3000 m, while *F. stephaniae* occurs at intermediary depths, around 1200 m.

Until the discovery of the new species, the only *Falsimargarita* known to occur in latitudes north of 50°S was *F. iris*, which reaches 35°S (Rosenberg, 2004). *Falsimargarita stephaniae* is the second species recorded for these latitudes.

ACKNOWLEDGMENTS

We thank Helen Racz for the donation of the studied specimen; José H. Leal, The Bailey-Matthews Shell Museum, Sanibel, Florida, for literature; Lara Guimarães, MZSP, for help with SEM; Diego Zelaya and one anonymous referee for comments on the manuscript. This study is partially developed with financial help from the State of São Paulo through grants from Fapesp

(Fundação de Amparo à Pesquisa do Estado de São Paulo), processes 04/00309-2, 04/02333-S.

LITERATURE CITED

- Dell, R. K. 1990. Antarctic Mollusca, with special reference to the fauna of the Ross Sea. Royal Society of New Zealand Bulletin 27: i-iv, + 1-311.
- Hedley, C. 1916. Australia-Antarctic expedition 1911-1914. C - Zoology and Botany. Government Printer, Adelaide 4(1): 1-50 + pls. 1-9.
- Powell, A. W. B. 1951. Antarctic and Subantarctic Mollusca: Pelecypoda and Gastropoda. Discovery Reports 26: 47-196 + pls. 5-10.
- Rosenberg, G. 2004. Malacolog version 3.3.3, Western Atlantic Gastropod Database. <http://data.acnatsci.org/wasp/index.php> (accessed on 07/11/2005).
- Smith, E. A. 1915. Mollusca. Part I. Gastropoda Prosobranchia, Scaphopoda, and Pelecypoda. British Antarctic ("Terra Nova") Expedition, 1910. Natural History Report. Zoology 2: 61-112, pls. 1-2.
- Zelaya, D. G. 2004. The genus *Margarella* Thiele, 1893 (Gastropoda: Trochidae) in the southwestern Atlantic Ocean. The Nautilus 118: 112-120.

Notice



BIVALVIA 2006 - INTERNATIONAL CONGRESS ON BIVALVIA, BELLATERRA (BARCELONA), SPAIN, 22-27 JULY 2006

The congress, to be held at the Universitat Autònoma de Barcelona, calls together neontologists and palaeontologists with research interests in bivalve mollusks. Plenary talks include population genetics, evolution of ontogeny, evolutionary paleontology, biomineralization, and freshwater conservation biology, but contributions need not be restricted to these topics. In addition, there will be a planning session for a new bivalve treatise.

Two one-day excursions—one each on recent and fossil bivalves—will be organized.

Interested parties are asked to register and submit abstracts via the congress webpage <http://bivalvia2006.uab.es>.

Further inquiries may be directed to Niko Malchus (n.malchus@gmx.net). Please include in the subject line "Bivalvia 2006".
